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ABSTRACT

Borrowed from the literature of more than two decades ago--when it alluded to key communicators within organizations--the concept of "gatekeeper" is reintroduced in this report. The role of information counselors, who, like informal gatekeepers, take part in liaison activities, networking, advising, information filtering, transmitting, and repackaging, is described as being a type of professional gatekeeper, with current emphasis on adding value to user-oriented information systems and services. The transition to a new role within organizations is discussed, focusing on: trends that necessitate the new role, the shift of emphasis in systems design to user involvement, mastering the complexity of infrastructures, interfacing with special groups of users, and strengthening the process of evaluating information systems. Highlighted functions of the information counseling role include increasing the value and decreasing the cost of information products and services to users. Assessing information needs in developing countries, cross-national cooperation, and transborder data flow are key policy issues focused on. It is recommended that: (1) pilot research and demonstration projects be carried out to identify and test the information counseling model; (2) a job profile be formulated based on user demand inventories; (3) corresponding guidelines be constructed; (4) education and training requirements be developed; and (5) the results of such study be disseminated. (SD)

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From Informal Gatekeeper to Information Counselor:

Emergence of a New Professional Role

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INTRODUCTION

The purpose of this descriptive study is to identify some of the concepts and trends in the application of the "information gatekeeper" phenomenon. It is essential to emphasize the limitations of this preliminary exploration. We have not attempted to cover all aspects of the topic. Findings of pertinent studies in organization theory, decision science, cognitive psychology, communication science and information economics could not be included. Nor does the literature underlying this document do any justice to the universal nature of the gatekeeper concept and to its remarkable potential for cross-cultural investigation. More examples should have been drawn from development studies and from the studies and experiences of information professionals in developing countries. These omissions were due to the time constraints of the present review. We recommend compilation of a research inventory on the relevance of the technological information intermediary to social and economic development.

We had to resist the temptation to discuss other gatekeeping-like phenomena such as research diffusion and utilization, technology transfer and adaptation, innovation management, and international consulting. These processes are closely related to the gatekeeping function. They share some objectives, psychological characteristics and essential skills with the gatekeeper's role, and they share its potential for enhancing the effectiveness of information transfer. We will be able to mention some of these research areas only tangentially. However, it is our hope that the present brief study and recommendations, in spite of their shortcomings, may stimulate discussion of and contributions to this international topic.

1. CONCEPTUAL FRAMEWORK AND EXAMPLES OF STUDIES

The idea of this study was conceived in an information use-oriented context. What justifies the interest in the gatekeeper's role is its impact not only on various types of information "users" but also on different information seeking or browsing situations of the same users.

For purposes of our analysis, we define data as the raw materials of information. Information is typically defined as the composite of messages, including signs, data, facts and narrative, that a human being receives from the outside world and applies to information situations such as problems, tasks, decisions, learning, reflection or leisure. We perceive of information as both formal/structured and informal/unstructured messages. Knowledge will be conceptualized as information fused in the human mind by experience and intuition.

Although the concept of the "gatekeeper" appeared in the literature more than two decades ago, it is still being interpreted in many different ways. Its study and practice spawned an extensive and ambiguous terminology. To some scientists, "gatekeeping" means excluding rather than transmitting information. However, an analysis of a few selected studies on the topic will conclude that this concept, albeit controversial, could be helpful in adding value to user-oriented information systems and services. Even if the development and support of information gatekeeping functions in an organization does not represent a solution of all the problems of information seekers, an effort to understand the ways gatekeepers access and disseminate information will be an important step towards knowledge utilization. Moreover, an organi-

zation's decision to invest in this strategy and to lend policy support to it might lead to the recognition that gatekeeping processes are less expensive than other options.

In recent decades, several research approaches led to the identification of the role of key communicators in organizations. Variously referred to as gatekeepers, change agents, linking agents, communication stars, middlemen in vertical information transfer, or knowledge adaptors, these intermediaries have been described as relayers of problem-oriented or technical information. "Gatekeeping" is usually seen as an informal facilitating role rather than a formal position. Gatekeepers emerge in an organization's communication and information transfer activities without systematic training and designation. They often perform their function in addition to their formally defined responsibilities. Locating information pertinent to innovation projects from the external environment and diffusing it throughout the internal research project are their strengths. In some situations, for example in interorganizational networking, these key communicators form networks of peers for information sharing outside of their organizations. Although applied researchers have tried to explore ways of semiformalizing the gatekeeper's approaches and some organizations have assigned to regular staff members well-defined responsibilities for internal and external networking, gatekeeping essentially remains an informal function.

The present document will introduce the concept of "information counseling" (IC) based on a composite model of earlier work on counseling integrated with "gatekeeping" attitudes and activities. The information counselor is an information professional whose role includes contacting,

liaisoning, networking, advising, information filtering, transmitting and repackaging -- activities usually carried out by "gatekeepers" informally. One could call the information counselor a "professional gatekeeper." Of course, this latter term consists of two meanings that contradict each other. If the greatest strength of gatekeeping is its informal nature, what could one achieve by formalizing it? To seek answers to this question, we propose that the activities and characteristics of informal information gatekeeping, as observed in various studies, be mapped and studied. Instead of the controversial term "professional gatekeeper" we suggest "information counselor," a role that was conceptualized and described in the late 1970s and early 1980s (1, 2, 3).

In order to identify research trends and the implications of gatekeeping for the improvement of information systems and services, we offer a brief survey of five selected areas: (a) intermediaries in organizational information transfer; (b) the technological gatekeeper; (c) the invisible college and other networks; (d) information professionals as users of informal communication flows, and (e) information professionals as gatekeepers.

1.1 INTERMEDIARIES IN ORGANIZATIONAL INFORMATION TRANSFER

In the 1960s, interest in the informal linking role played by some individuals in organizations led to studies of vertical information flows and communication chains. Empirical investigation centered on the flow of information through several levels of expertise, from the originators of an innovation to practitioners and decision makers. Colman, Katz and Menzel (4), Katz (5) and Menzel (6) studied modes of diffusion and appli-

cation in medical, scientific and technical innovation. The work of Rogers and Schoemaker (7) revolutionized the thinking about communication patterns in diffusion projects. Years later, a revision of a major paradigm and new approaches to diffusion were offered by Rogers (8, 9). Havelock and Markowitz (10) analyzed the transfer of information between researchers and decision makers in the field of highway safety. However, Havelock made his main impact by research on informal networks and human linkages (11).

These studies identified intermediaries (sometimes called "middlemen") and their special role in the information transfer syndrome. They linked the originators of knowledge with knowledge users by bridging disciplinary and organizational boundaries. Other research efforts, with intellectual ties to management information theory and decision making under risk, formulated problems of information use by decision makers. Most studies dealt with processes in scientific and technological information. Allen (12) provided the research groundwork and disseminated the term "technological gatekeeper." Holland (13) termed an organization's special communicator "the key" for informal information sharing. Alter (14) and Churchman (15) probed into the manager's information seeking and use. Based on empirical investigations of political and social factors affecting policy makers' decisions in the Nigerian Civil Service, Aiyepeku (16) reported on how this population conceptualized and used information and what barriers they encountered. Baker (17) pointed to informal group communication as a management tool.

The picture of the gatekeeper's social domain and sphere of effectiveness would not be complete without reference to the considerable body of research on key communicators in human services and health care. While medical innovation is usually classed with the literature of science and technology, research on health care and human service management is predominantly a social science arena, including studies in health economics, quality of care and consumerism. In this environment, the gatekeeper is a central information relayer in a community setting, in hospital management, in a social service agency, or in a local government program (18, 19). The attributes of the activity treated in this research, especially the interdisciplinary nature of health care teams, show significant difference from the attributes of scientific and technical gatekeepers. Scrutiny of the international policy climate of health and environmental management leads us to the recognition that information intermediaries would be extremely supportive of coordination and problem solving in these crossdisciplinary sectors (20).

The results of two decades of research on informal communication modes in the organization and in its external environment began to bear fruit in the late 1970s. In addition to health care, the field of education witnessed many of the applications in the form of systems making research available to teachers, administrators and education policy makers (21). Ogunniyi (22) reported on such a network in Africa attesting to the international interest in the networking paradigm.

1.2 THE TECHNOLOGICAL GATEKEEPER

Of the various types of the information intermediary identified in the literature, the "technological gatekeeper" is the most relevant to developing countries. Technological gatekeepers have been defined as individuals in firms who channel and distribute internally, technological information from external sources, especially from foreign countries. Allen, Piepmeier and Cooney (23) found that technological gatekeepers or "communication stars" within an industrial organization play a central role in the international transfer of technology. These individuals were found to make significantly greater use of scientific and professional journals than their colleagues in the firm. Consequently, their peers turned to them in order to speed up access to information. Technological gatekeepers were also found to develop a network among themselves, thus considerably expanding the range of contacts between the organization's staff members and information sources at the international level.

Subramanyam (24) reached similar conclusions in India. Having identified and examined four major phases in the continuum of communication (generation, recording, surrogation/dissemination and utilization), he concluded that a considerable amount of information is transferred directly from generators to ultimate users through technological gatekeepers, bypassing formal means of surrogation and dissemination.

The importance of a holistic approach to the interrelations of social needs, knowledge, culture and technology, compelled many researchers with international development experience to question the effectiveness of information transfer across cultural borders. Although

Allen (25), Baker (26), Johnston and Gibbons (27) and others studying technological innovation provided useful models for identifying and optimizing information flows, these models are not necessarily applicable in other parts of the world. Depending on social, economic and cultural factors, the complex process of industrial innovation itself varies from country to country. There are different kinds of institutional mechanisms to evaluate and adapt technology and social programs for local use, and there are different legal provisions for licensing, marketing, distribution and training. As papers edited by Srinivasan (28) emphasize, following decades of rush for new machinery and technical knowledge in developing countries, the importance of technology assessment is just beginning to be accepted. Evaluation, choice, and, if necessary, rejection of technology as inappropriate are processes in dire need of information underpinnings. It seems then that information specialists in various countries who act as technological gatekeepers in international projects or local firms, would do well to acquire understanding and information skills in support of technology assessment. However, the ultimate goal of information intermediaries in each country is to promote local research and indigenous innovation.

1.3 THE INVISIBLE COLLEGE AND OTHER NETWORKS

The gatekeeper is a central actor in organizational communication and information transactions; in networking the emphasis is on the participants. Gatekeeping is rooted in individual personality traits and information processing capabilities; networking draws on intracultural and crosscultural communication for its existence. It can be expected

that information transfer would be dramatically improved by the merging of these two processes. Typically, information transfer in networks takes place along lateral lines, and it is focused on the external environment of organizations. Organizational gatekeepers might form a new network in their geographical area or in specialties of interest to their organizations, or they might utilize existing networks.

The network concept has been used in psychological, sociological and technological contexts. Definitions are conflicting and often so vague that each study has to define the term for its own purpose. A "human resource network" means the mutual support mode of sharing knowledge, observations, documentation, data or opinions by people who are well informed in a field, whether this field is their primary area of specialization or an avocation. Interdisciplinary cooperation often develops around a scientific or social issue that needs the problem solving ability of various professions and disciplines. Crane (28, p. 338) observed that "Scientific fields can be defined as broadly as a discipline or as narrowly as a problem area (a cluster of closely related problems)." The same researcher tested the hypothesis of the functioning of informal networks in science and became its major disseminator (29).

Information sharing is the process by which individuals act as information consumers as well as information providers. Transactions in an information sharing network may include information acquisition, referral, information sharing, resource identification, resource acquisition, verification, opinion exchange, and many others. Informal information resource sharing is a complicated social process because its effectiveness depends on behavioral and psychological variables. Not

only the continuous processes of information seeking/finding and information providing/accepting, but also the nature and quality of the information content depend on individual cognitive styles, personal circumstances, and time-bound events.

The informal communication networks of scientists have been studied and reported on in a voluminous body of literature. A major review of research was carried out by Cronin (30) covering historical and sociological perspectives, categories of studies by methodology, doubts expressed by researchers about the paradigm, and recommendations for future research. From the vantage point of the present document, it is imperative to note that several authors in the Cronin review warned against attempts to formalize the patterns of informal communication.

One of the early findings of "invisible college" research by Price (31) gave rise to the concern that in peer information exchange networks a few "core scientists" formed an elite group of communicators. Empirical data on scientists working in several narrowly focused specialties supported these findings. For example, Crawford (32) investigated scientific knowledge diffusion through invisible colleges on the topic of sleep research. In Japan, Hayashi (33) reexamined Crawford's conclusion that information gatekeepers may be part of invisible colleges by conducting a survey of communication flows among Japanese researchers who investigated the effects of manganese on human beings. He confirmed that some scientists showed a higher rate of communication activity than others.

In the 1970s, a few researchers, each working independently, addressed specific problems in organizational communication and thus offered new insights into the study of networks. Within a few years, Athanassiades (34) and O'Reilly (35) published papers on the evidence of the distortion of information in communication flows.

In recent years, the perception of social networks as elitist, peer-dominated, scientific "clubs" gave way to a vision of networks as constructive self-help tools for personal growth and community development at the grassroots level (36). This trend now brings closer the South and the North; similar basic networks have been in operation in Africa (37), and the rural devlopment model is said to be a version of informal flow.

We may conclude that in "horizontal" information exchange, beyond the boundaries of the organization, just as in the "vertical" information transfer chain within the organization, some individuals play a special role that affects information access and dissemination in several ways. The models of the general information gatekeeper, the technological gatekeeper and the invisible college, representing important findings, also raise critical questions about their applicability to the improvement of information systems and services.

1.4 INFORMATION PROFESSIONALS AS USERS OF INFORMAL COMMUNICATION FLOWS

By information professionals we mean librarians, information managers, archivists, and other workers who handle information professionally. Traditionally, the information profession relied on recorded

information in print and nonprint sources. In recent decades, source use and channels of information acquisition diversified in all types of institutions and communities. Librarians and other information workers serving specialized user populations and often called upon to obtain information beyond the boundaries of the specialty, for example interdisciplinary interpretation of technical data, have been the early explorers of informal resources and communication techniques.

We may assume that a librarian's use of informal information resources is not entirely different from that of other professionals, unless the librarian was thoroughly indoctrinated in the "recorded-information-only" tradition. We can hypothesize that librarians and other information specialists who tended to turn to informal sources to gather information in response to clients' requests indeed used a "gatekeeper approach."

Flavell (38) reported that the librarians in a study consulted the most accessible sources such as colleagues and personal files before turning to formal channels of information gathering. He pointed out that informal channels are capable of filtering out irrelevant or excessive information while formal systems are not able to provide or use filters. Flavell's findings were also meaningful in the sense that he conceptualized the difference between information resource on the one hand and channel or mode of access on the other. Thus, he perceived a paradoxical relationship between source and channel by suggesting that the librarians in the study were "informally using the formal." Wilkin (39) also called attention to the information professionals' growing awareness of informal

networks and their interest in establishing working relationships with contact persons who act as important channels of information in a variety of disciplines.

1.5 INFORMATION PROFESSIONALS AS GATEKEEPERS

This class of research includes studies of libraries and information centers as communication media. Information professionals who are effective communicators have a natural propensity for carrying out gatekeeping functions because (a) they are boundary spanning individuals who can develop empathy with people in other institutions, other disciplines and other types of work; (b) they are traditionally service- and user-oriented and thus can be expected to balance the need for public information with the need for personal privacy and proprietary data; and (c) they are open to new technology and skills and are willing to explore techniques of "translating" and "repackaging" information to fit specific uses.

Hagelwide (40) suggested that libraries be considered publicity-oriented "medial channel systems," a concept derived from communication science. He emphasized the library's function as opinion leader and the librarian's role as gatekeeper. Having studied the characteristics of communication among social science researchers, Evans and Line (41) proposed that information officers work in close proximity to their clients, maintain ongoing contacts with them, and become involved in the process of identifying research problems.

The conference on "New Technologies in Public Administration" in 1978 analyzed the ways a human intermediary affects access to public administration knowledge and experience (42). It was recommended that information gatekeepers serve on administrative teams responsible for making decisions.

In the past, library and information practitioners tended to confine their reading to publications in their own professions. Today they evidence growing interest in sociological and communication science studies. Using research on boundary spanning attitudes (43), communication in bureaucracies (44), the problem of information overload (45) or "the art of filtering" (46), one identifies findings of consequence to gatekeeping activities. However, care must be taken to evaluate the quality of problem selection, problem formulation and the integrity of methodologies. Reviews of research can provide guidance in selecting sources.

1.6 RESEARCH REVIEWS

Assessments of state-of-the-art research are especially useful for identifying new trends in the interpretation of the gatekeeper's role. Intermediaries handling a large volume of direct or computer-mediated information transactions are exposed to problems that concern computer security, privacy of data, intellectual property, equity of access, transborder data flow, and other current policy issues. Monographs and review papers can trace the evolution of an information practice or policy, or they can serve as sources for searching out scenarios of

future trends. The following examples may illustrate the range of reviewing activity. Maricic (47) published a broadly based review of the philosophical perspectives of information science derived from universal scientific concepts. This erudite synthesis is recommended as background for the informal communication paradigms.

Craig (48) reviewed the area of individual differences in information processing style, and Greer (49) surveyed research on networking. The appearance of the evaluative review of research by Cronin (50), and the overview and case studies of information systems planning in developing countries by Bell (51) filled the respective gaps in professional awareness of the social impact of networking and of technology transfer. Ng'ang'a (52) combined a pragmatic approach to improving the services which an information intermediary can offer if user needs are carefully considered with a brief coverage of pertinent research.

In 1987, Salasin and Cedar (53) suggested that on the basis of research studies addressing communication networks, strategies for the improvement of the information flow among researchers, practitioners and policy makers could be developed. They recommended that the difficulties of accessing knowledge be remedied by the appropriate "packaging" of information.

1.7 OBSERVATIONS DERIVED FROM THE LITERATURE REVIEW

Based on the foregoing rudimentary analysis, we may identify three broad types of information gatekeepers:

1. Specialized researchers actively transmit information without any formal function in information services and without any training in information or communication techniques. They approach communication and information from the framework of the problem solver, and this is their strength. The gatekeeper carries out informal activities within or outside of the organization. Scientists usually participate in external information sharing networks to enhance their own research.
2. The technologist or technological manager, less visible in the extra-organizational environment than the scientist but usually holding more managerial responsibility in the organization, transmits information as either a formal or informal activity. Such technological gatekeepers disseminate information mainly within the organization and participate in external information sharing networks to serve the organization's goals.
3. The information professional, who may or may not hold a managerial position in the organization, actively transmits information as part of a professional responsibility. Activities similar to those of the scientific and technological gatekeepers might be included in the formal job or might be personally initiated and informally pursued. This kind of work is carried out mainly within the organization and, at the present, is seldom considered "gatekeeping." Infor-

mation specialists participate in external networks only when networks formally serve the goals of the organization.

2. TRANSITION TO A NEW ROLE IN THE ORGANIZATION

The controversy over the effectiveness of informal versus formal communication flows is longstanding and still unresolved. There is certainly evidence to indicate that many studies over the years have identified enough advantages in the informal networking and gatekeeping patterns to recommend further research of them (54). Both benefits and drawbacks of these communication phenomena stem from the informality of the operational style. Formalization of some or all functions has often been attempted either on the premise of earlier research findings or on the basis of practitioners' experience.

In the 1970s the trend towards the systematic utilization of informal communication gathered momentum. Allen and Cooney (55) unleashed a new surge of possibilities and debates when their study on research and development scientists and engineers in Ireland concluded that interpersonal contacts among individual scientists, engineers and "international gatekeepers" can be effectively managed. The study propelled the controversy into the international arena drawing protests against and support for the notion that informal scientific and technical activities might be improved by managerial streamlining. Completely apart from this policy-level disagreement, more and more organizations began development of directories and databases of specialists, particularly in crossdisciplinary problem areas such as resource management, population studies, and nutrition. In the United Kingdom, the role and

proliferation of expertise registers were acknowledged by a survey of "indexes to persons and their special knowledge of skills" (56).

The contention regarding "formalization of informal communication" brought to the forefront the following questions which are still viable today.

1. What was the reaction of researchers and practitioners, who are the participants in informal gatekeeping and networking, to the attempts to formalize? Cronin reviewed warnings against and cautious support for institutionalizing informal activities. The reviewer hinted that one should not fall into the trap of thinking that ".... by tampering in some unspecified way with the essential features, a formalized and enhanced model of the information system will emerge ..." (57). However, he believed that further investigation of the informal communication phenomena would be fruitful.

2. How do we distinguish between individual expertise and organizational expertise? This question must be answered by everybody who is seriously considering a new communication model in organizations. In her review of knowledge diffusion in health care organizations, Greer (58) reviewed theories falling into three categories: adoption of innovation by individuals, organizational attributes affecting adoption, and knowledge dissemination based on specific decisions. Her conclusions implied that organizations might not be as useful and flexible in information exchange as are individuals.

3. What efects do informal networks and gatekeeping activities have on research and management productivities in developing countries? Would formalization improve information provision? In light of current global

imbalances in the availability of information, the necessity to increase international communication seems to be a basic tenet. Because of economic pressures and the urgency to improve social conditions, formal positions of local information intermediaries in government, industry, community and university might be the most effective alternative. Intermediaries would have to deal with technological as well as developmental and social tasks. As Elmandjra asserted: "the information revolution is creating totally new ethical, political, legal and economic problems the implications of which are not yet fully apprehended by decision makers" (59). Organizations are seen as open-ended learning systems where, to be successful, managers must absorb new strategies and skills throughout their working life (60). Information professionals are called upon to broaden their sociological understanding and be "knowledgeable about the channels of communication through which knowledge is generated and communicated ..." (61).

4. How does informal communication affect the international distribution of knowledge? Altbach (62) identified more actors in the invisible college than most other researchers. Analyzing the dissemination system of publishing and scholarship, he defined conferences, scholarly journals, professional associations, and publications as institutionalized elements of the invisible college, with editors, publishers and other knowledge workers acting as gatekeepers. In Altbach's view, "Third World researchers are at a particular disadvantage because they are not only distant from the centers of scholarly power but they frequently lack the resources to fully participate in the knowledge system of the

invisible colleges" (63). The author envisions steps toward a solution by a careful understanding of the nature of networks.

Research on gatekeeping and networking and widespread attempts to formalize these activities lead us to believe that the time has come to consider development of a new intermediary model including the best elements of the gatekeeper and invisible college models. We believe that these roles have not been successfully formalized because, as communication phenomena, their informal nature should remain informal. But if their best features and communication activities were integrated with the model of information counseling, the three paradigms together could create a powerful new role of communicating information and advising users.

2.1 INFORMATION COUNSELING

Information counseling (IC) is a new approach to in-depth personalized user assistance in the identification, acquisition and application of information. It has been defined as

> "the interactive process by which an information practitioner (a) assesses the information needs of an individual or organization, (b) determines the optimal ways to fill such needs, and assists the client in information use, (c) assures systematic follow-up and feedback in order to evaluate the effectiveness of counseling. Information counselors can optimize their effectiveness by accessing, on behalf of their clients, not only formal information systems but also support networks and human resource networks" (64).

In brief, IC is an intensive mode of human interaction to assist the user not only in locating, but also in absorbing and applying information.

The process of information counseling includes:

- Assessment of needs and requirements in the organization
- Formulation of policies on confidentiality, intellectual property, equity of access, etc.
- Assessment and inventorying of information resources
- Client interview and individual need assessment
- Information provision and technical assistance information utilization
- Follow-up, feedback, evaluation, reassessment of needs.

The IC model emanates from concepts embedded in the literatures of four crossdisciplinary areas. Knowledge utilization is an emerging discipline addressing the complex process of transmitting the results of research to practitioners, policy makers or consumers who are assumed to make use of them in order to make informed decisions. In the 1970s, several studies focused on organizational and personal factors that produced some change after people used information (65).

In the research field studying the diffusion of innovations, the early model of one-way dissemination of information to decision makers was replaced by bi-directional communication and by social networks to facilitate social change (66). Another development underlying the IC model was the convergence of communication studies and information retrieval studies. Researchers in both fields have approached problems of cognitive style and behavior evident in problem solving. One of the prolific areas of innovation is online searching where a variety of user-oriented interface systems have been studied. Hend[illegible] (67) brought

together a number of papers on the design, development, manipulation and impacts of expert systems. The fourth area that significantly contributed to the conceptualization of the IC model consists of studies on the various applications of interpersonal counseling (68). In these studies there is generally a deeper understanding of the possibilities and fallacies of interaction than in information science research.

2.2 TRENDS THAT NECESSITATE THE NEW ROLE

The "information society" might be described as complex, technologically sophisticated, rich in information impulses, media and resources, but poor in the human capacity to understand, process, filter and use data and information to meet economic, social and personal needs. Societies which are referred to as "rapidly industrializing," are beginning to accumulate similar characteristics (69). Although many requirements for information and experience have been met by knowledge processing (expert) systems, it seems that as one area of need is met, another, usually higher level need for filtered, reordered or synthesized information, appears. Even though easily usable systems for retrieving formal information can be expected to make further progress in the future, there are indications that human intermediaries will still be needed for a number of intellectually challenging tasks. These tasks will be likely to fall into three main domains: (1) the coordination and evaluation of the products and services of information systems in the context of each user's needs, (2) formatting, repackaging, disseminating, synthesizing and otherwise enhancing information, and (3) supplementing

formal information systems by the multiplicity of informal channels and sources which are often indispensable in meeting user needs and requirements.

In response to managerial shortcomings that often resulted in the chaotic or wasteful creation of information systems and the subsequent lack of system utilization, information resource management (IRM) has emerged and is being implemented in several countries. Research has indicated that gatekeepers are active partners of management in fulfilling strategic tasks. Should the information professions succeed in developing and testing the counseling model, it could become a step toward meeting the above expressed needs.

Several trends in both the developing and industrialized areas of the world support the need for better exploiting the benefits of information gatekeeping. These trends, confirmed in the literatures of development science and informatics, are:

- A new perception of information as economic commodity and national resource by national policy makers.

- Convergence of telecommunication and computer technologies in existing and evolving national information infrastructures.

- The need for coordinated information policies and consideration of information economics at the organizational, national and international levels; the need for a corps of policy-oriented information professionals in each country.

- Growing complexity of information infrastructures; lack of one-step information services; the need for information intermediaries who can communicate with several groups of users.

- Increasing number of specialized information users in research, development and management in crossdisciplinary areas such as environmental preservation, population studies or development science.

- The importance and difficulty of reflecting user-demand aspects in information system design.

- The need for research skills applicable to the assessment of new information and communication technologies for the identification of user requirements, and the evaluation of information system performance on the basis of users' perceptions.

- The importance of avoiding information overload and redundancy, and filtering, repackaging and disseminating research findings for policy makers and practitioners.

2.3 SHIFTING THE EMPHASIS TO USER INVOLVEMENT

For years information professionals have been searching for an answer to the puzzle of high quality yet under-utilized information retrieval systems. Designers of systems have been criticized for concentrating on the supply aspects of the system rather than on the user

demand side. Innovative and elegant solutions seem to be no guarantee against the user's frustration with the information content of the system or the form of the product or both.

One of the explanations suggested by several authors in the literature is that when the objectives of system development are formulated, designers too often work without significant contact with potential users. However, a thorough understanding of the consumer is extremely difficult to achieve. Few researchers conceptualize the difference between information requirements (expressed wants) and needs (not always expressed or perceived wants). The applicability of operational and logistic processes to the technical problems of information systems are much easier understood than the cognitive and behavioral dimensions of human decision making and problem solving that the information system should support (70).

2.4 MASTERING THE COMPLEXITY OF INFRASTRUCTURES

In spite of intensive research and development to render information systems more user friendly and economical, the infrastructure, encompassing telecommunication and computer systems in interaction, is a rapidly expanding maze. Interconnected networks offering access to a multitude of databases through an ever increasing number of service providers and the competition between work-related and home-based information services present an often insurmountable barrier to the user. Moreover, a trend toward privatization in developing countries has been noted (71). It can be expected to increase competition and the number of

information enterprises and products, and to lead to a more pronounced need for information intermediaries.

A recent study illustrated the intricacy of selecting the most appropriate database and host in response to a particular request (72). The following steps were identified:

- Decision on bibliographic or source database search
- Decision on single or multidatabase search
- Decision on number of databases to be used
- Selection of database according to such criteria as

  coverage (subjects, types of documents, languages, geographical area, document selection for scanning, selection of papers within a publication scanned, etc.)

  Indexing structure and type of vocabulary

  Time span

  Timeliness of information

  Availability of abstracts

- Selection of host according to such criteria as

  Accessibility through available communication lines

  Search features allowed

  Cost

  Methods of search result delivery

  Possiblility of online ordering.

It is also useful to review the research perspective on factors that affect online search and retrieval (73). The variable identified in this paper might be adopted by the pilot project studying the information counseling model.

Following retrieval, the user faces another set of decisions about the following attributes of the information:

Proximity

Timeliness

Relevance

Credibility

Appropriateness

Affordability

Applicability

Usability

Currently, there is a widespread belief among researchers that most of these postretrieval decisions can only be made by the user and some cannot be made in the tradition of rational decision making at all. Other information scientists hold that neither the preretrieval, nor the retrieval nor the postretrieval process can be separated from individual ways of human thinking. Is it likely that, in view of the user-accommodating systems, the majority of users will be prepared to accept the timeconsuming process of all these decisions? Does a partnership between the user and the information counselor with familiarity of the task to be accomplished or the quandry to be removed on the one hand, and knowledge of available systems and resources on the other, hold great

promise? Considerable research will be needed to pose and approach these questions.

2.5 INTERFACING WITH SPECIAL GROUPS OF USERS

Critics of the gatekeeper and invisible college paradigms often refer to the elitist nature of information dissemination and exchange, because unstructured and informal communication flows tend to favor individuals who are knowledgeable, influential, and effective communicators themselves. It seems likely that whenever the selection of who participates in and who is bypassed by the exchange of ideas is left to the dynamics of a completely uncoordinated network, the benefits of information sharing will go to the individuals in the organization or in its external environment who are the most likely to reciprocate with innovative and useful materials. In contrast, carefully planned efforts towards the partial formalization of gatekeeping activities may lead to improvements in the otherwise unpredictable and selective nature of informal information sharing.

With regard to "special groups" of potential users, we may identify two broad categories: those who face special barriers to information (e.g. handicapped persons, older persons, rural dwellers), and those who require especially speedy and specialized information services (e.g. decision makers, researchers, mass media specialists). A few examples of specialized users follow.

Many research efforts in the 1960s and 1970s were targeted on decision makers, an ill-defined and heterogeneous population including policy makers, managers, legislators and others responsible for

planning and control. Studies of decision makers as information users have been based on the notion that in any organization or society, the gathering, transmittal and utilization of intelligence have an impact on the performance of the organization or society. It has been shown that in the firm each level of management function and decision making - operational, administrative and strategic - requires differently structured and transmitted information (74). At the highest level of strategic processes, research and development for problem solving represent the extreme examples of creative knowledge production. At this level, decision makers were found to prefer verbal communication and information in concise and synthesized presentation. Pursuant to recommendations by researchers, numerous improvements have been made in the design of management information systems (MISs) and decision support systems (DSSs) (75).

New approaches to the study of decision making eventually overshadowed earlier findings. Disillusioned with widespread assumptions that decision making is a rational and structured cognitive process, researchers turned from individual to organizational approaches. Each new paradigm created a change in the information user's image. Today, decision making is being studied with the assumption that, in most cases, it is not a systematic, textbook-like process, but an intuitive and often unpredictable human phenomenon (76, 77, 78). Choices leading to innovation in policy or technology are analyzed as critical elements in organizational effectiveness. Utterback (79) suggested a "wide holistic appreciation" of innovation as a creative human activity that we understand only in a fragmentary way.

In their review of research on the role of information in the competitive struggle to increase productivity, Cronin and Gudim (80) suggested for future research studies that the linkages between R & D and technological innovation be traced.

Although most approaches to the conceptual or organizational ordering of information recipients bring together the users of scientific and technological information into one cluster, there are strong arguments for considering these two groups separately. It is true that scientists and technologists work together in teams, and that they often share the motivation for designing new products and processes. They often write joint research reports and papers, and use information for their teamwork. They also play a joint role in public policy development. However, to the extent that one can generalize, scientists and technologists differ considerably in their priorities, their approaches to problem solving, their work habits and their use of information. Although the characteristics of the two groups overlap, we will discuss the potential role of information counseling for each group.

Scientists comprise a broad and diversified community of individuals who contribute to the process of discovery and innovation or to the interpretation and synthesis of existing knowledge. Scientific researchers need a policy environment that, among other objectives, (a) stimulates and supports creativity and systematic investigation, (b) maintains the infrastructure necessary for scientific development, (c) promotes long-range goals and recognizes results that may be evaluated over a lengthy period of time, (d) concerns human resource

development, and (e) facilitates contacts with scientists and organizations in other countries.

Within both the natural and social sciences, there are traditional as well as new groups whose activities are influenced by economic and social forces and who represent constantly changing information requirements. In some disciplines, we can still identify basic researchers in theoretical and experimental work who aim at the expansion of knowledge without any immediate utilitarian objective. One can still distinguish applied and problem-focused investigators whose objective is to contribute to the solution of specific problems or to the improvement of services and products. Examples of activities relevant to scientific development, with clearly identifiable data and information demands, include risk assessment in environmental management; technology assessment; patent, trademark, licensing and other economic and legal documentation in non-legal language; the development of social and health indicators and social accounting procedures; and many other crossdisciplinary activities scientists have been involved in.

In spite of new fields of specialization characteristic of the scientific sectors of technological societies, there are shared values and beliefs that form strong bonds among scientists. The identity of the scientist based on a belief of the oneness of science in the whole world, is one of the most forceful ties. From this philosophical foundation rose the principles of objectivity, collectivity, universality and cumulativeness. These values have been questioned by scientists who deem them to be "Western" in cultural origin and not globally applicable.

However, with exceptions, these values are accepted as unifying by the international scientific community (81).

In applied research and development, the team consisting of different specialists forms the basic unit of organizational structure. Innovative teams which are more autonomous and work on new products have been found to be more active communicators and information users than operational teams because the former type deals with more complex tasks (82). It is possible that the integration of an information counselor into an innovative team would lead to the exploration of new fields of knowledge, to a decrease of the risk of duplicating work done elsewhere, and to enrichment of the team's work by information from extraorganizational sources.

The technologist's policy environment is different from that of the scientific researcher, many commonalities notwithstanding. National technology policy in each country is expected to (a) stimulate the generation of knowledge for the solution of problems that have been identified and described in industry; (b) motivate research applicable to improvements in the quality of life; (c) identify and utilize basic research results; (d) address the education and training of technologists, and (e) foster short-term objectives and the assessment of results within a short period following research and development.

The potential information user group of technologists is seen as a very large one because it is said to identify with all individuals who use technological information in the course of their work. Included in this category are engineers, development specialists, technology transfer specialists, industrial planners and managers, the legal experts and

economists of technology, those involved in trade and business investment decisions depending on technology, and educators specializing in various aspects of technology. Many of these potential users also generate information although they are not as clearly identified with writing and publications as are scientific researchers.

It seems that the advice and assistance of a specialized intermediary are particularly appropriate for this group of users. First, the concept of the informal technological gatekeeper originated in this environment. Second, technological information services tend to benefit from the work of experienced intermediaries because of the need to locate crossdisciplinary economic, legal, and social information on technology impact. Third, contrary to their reputation for being secretive, industrial and technical organizations have much nonclassified information flowing in and out. As Mautort noted: "In an industrial technology anything that is not tangible hardware is knowledge, whether written down or held as individual know-how, whether freely accessible or proprietary, whether susceptible to acceptance and usage at the receiving end or not" (83).

A further example of the potential applications of the information counseling model may be found among mass media specialists. Several distinct user populations come into play here. The largest one is comprised of journalists, television and radio programmers, and other mass media practitioners. Educational media, corporate media, extension services, and information dissemination programs for community groups, agricultural workers and small businesses have their own characteristic information collection and production habits. The popularizers of

scientific and technological developments have an important intermediary function themselves: they interpret and repackage source material for their audiences.

Mass media specialists need "raw material" of a special kind. They attempt to base their programs and news reports on scientific and technological events and on facts extracted from a variety of sources. They need not only the assistance but also the teamwork of information counselors who identify and obtain scientific and technical reports, translations, tables and graphs, maps or video programs and reorganize appropriate elements from them into "digestable" form without error or distortion.

Information counselors could assume at least two further tasks in cooperation with media specialists. Each task has a potential social impact of significance.

First, counselors can help to spread the benefits of technology. As the MacBride Commission's Report indicated, "The amount of information available to those with access to present-day technologies has been immensely increased by developments in the new science of informatics" (84). This situation, marked by uneven opportunities and harm to people who are on the outside of technological advances, may be improved by well-designed information dissemination projects in cooperation with distance education programs and mass media campaigns.

The second task for the information counselor is to participate in and support the informal social networks of journalists and science writers. The goal is to identify information gathering habits and needs

that could be met by augmenting the services of libraries by making referrals and establishing liaisons with resource organizations.

2.6 STRENGTHENING THE EVALUATION PROCESS

It is not enough to design and implement information systems utilizing new technologies. System planning should already include the goals, criteria and methods of evaluation. The conceptualization of the criteria should make it clear that evaluation is more concerned with the effectiveness than with the efficiency of the services. A publication of the United Nations Industrial Development Organization (UNIDO) underscored this essential point of view:

> The literature of project appraisal commonly gives the impression that the goal is to produce a number or set of numbers that tells whether a project is good or bad. In reality, it is not the numbers themselves that are important, but rather the appreciation of the project's relative strengths and weaknesses that is gained in the course of appraising it (85).

One of the difficulties in evaluating the impact of information services on users is to distinguish between the value of the service and the value of the information (86). Several approaches are currently used to avoid the usual weaknesses of the evaluation process: (1) cost-benefit analysis, (2) analysis of "value added" features, (3) content analysis of feedback from users, (4) retrospective assessment of user perceptions of the performance, effectiveness and impact of the service and the information. Human factors influencing information utilization are considered critical.

It is evident from the international literature that evaluation research methodologies are becoming more mature and diversified. The literature that continues to proliferate includes carefully considered criticism of the use of weak methodologies. However, the "value added" mode of assessment suggested by Taylor (87) for the purpose of identifying the analytic and organizing processes that make information more useful for recipients was welcomed by most reviewers.

In view of the overall unsettled state of evaluation studies, we explored the experience of development scientists. A World Bank staff paper reports on a promising approach to development project evaluation that might serve as a useful model. At the outset of a project, criteria for evaluating each phase were built into the plan. This "monitoring and evaluation" process assumed the flexibility and adaptability of the project. Perceptions of local populations were queried not only retrospectively but also at periodic intervals throughout the project (88).

The concern for transferring inappropriate evaluation criteria and methodologies from industrial to developing countries must also be raised. Program evaluation is a sensitive sociocultural process and it should be developed within the country and by nationals of the country where it will be used. An evaluation model for developing countries was recommended by Fall and O'Sullivan (89).

An experienced intermediary might significantly contribute to the strengthening of feedback from users and enhancing its impact on the system. This contribution would consist of searching for new methodologies, including software, testing the "monitoring and evaluation" approach in a pilot setting, and disseminating results of the experi-

ments. Users who are often reluctant to participate in evaluation exercises are likely to appreciate the involvement in this activity of an experienced gatekeeper as an impartial interface with users and system.

3. GENERAL FUNCTIONS OF INFORMATION COUNSELING

For purposes of research and pilot projects testing the feasibility of information counseling, including a formalized gatekeeping process, a profile of expected professional functions will be offered. The profile was developed on the basis of needs defined in the foregoing sections. If proven useful by experiments, the information counselor's activities should include the following:

- Bringing information managers, information scientists and librarians together in an effort to optimize the effects of cooperation in planning information services,

- Assisting in the formulation of organizational and national information policies by identifying problem areas and demonstrating alternative options,

- Increasing consideration of the user in research, systems planning, information marketing and evaluation by acting as a link among researchers, user groups and system analysts,

- Interpreting the value of products and services provided by various information systems for specialized user groups,

- Improving the quality of formal and informal information transfer in relation to the needs of specialized user groups by decreasing information overload and increasing effectiveness and efficiency.

3.1 TRANSITION TO THE NEW ROLE

As suggested earlier, we are not recommending a job description or a formal education/training program for the information counselor. Activities, characteristics and desirable qualifications of counselors and gatekeepers will be considered beneficial for enhancing information transfer and services, but any formalization in these activities and attributes must be considered with caution.

We can identify several levels in counseling and gatekeeping where one might initiate strategies for action. The following levels of change range from the least amount of disruption in existing information organizations to the introduction of the most substantial policy change. Information centers, libraries, archives, records centers and information clearinghouses might consider the potential improvements these policies would bring to their user-oriented services. The function of all three models of gatekeeping, the scientist, the technologist and the information professional, should be analyzed to establish their relevance for a composite model of the information counselor.

1) Discuss counseling and gatekeeping functions in the organization at staff meetings and workshops in order to raise awareness of these activities and to improve both formal and informal communication in the organization and in the profession at large.

2) Provide information support to scientists, technologists and subject specialists who act as informal gatekeepers in the organization.

3) Identify and analyze activities and characteristics of gatekeepers; strengthen those which are the most useful for the organization, but leave them at the informal level.

4) Select the informal gatekeeping activities, and characteristics which are the most innovative and useful for the organization, and introduce them in staff discussions exploring their possible transfer into formal job responsibilities.

5) Examine the literature of the information counseling model and consider benefits and problems of adopting it for the organization on a trial basis integrating it with gatekeeping elements.

6) Test the composite model or parts of it in field experiments and pilot projects in order to identify its implications for the organization and for the profession.

7) Introduce policies for information counseling, including gatekeeping, in the organization if the results of research, field testing and policy discussions warrant such change.

3.2 INCREASING THE VALUE OF INFORMATION PRODUCTS AND SERVICES TO USERS

We reiterate our assumption that, in broad terms, there are at least two kinds of messages: factual/systematic/rational and intuitive/personal/nonrational. One of the common definitions of factual information is that it represents an increase of task-oriented knowledge obtained through communication. The output of an information service represents a certain value to the user which depends on the degree to which the acquired knowledge contributes to the solution of a task or problem. Each message has a different information value for the receiver, and the value of the same message will be perceived differently by different users in different situations.

These characteristics of information have an impact on what the information will mean to the user. Information is characterized by the attributes of relevance, timeliness, accuracy, origin, form, and so forth. Enhancement in any of these attributes will increase the value of information. Information counselors can therefore play an important role in this regard. Examples of such enhancements follow.

The relevance of the information can be increased by understanding the information needs of the users, selecting the appropriate information resources, and identifying and selecting items of information. Information counselors should work closely with the users in order to under-

stand their problems and assist them in the formulation of their requests.

Information resources, in particular computerized databases, have different structures, utilize different search languages and allow for the use of different search strategies. Intermediaries should be aware of the limitations, coverage and search characteristics of different information retrieval systems. This knowledge will enable them to select the most appropriate database and host, and to translate the user's need into the most efficient search strategy.

An increase in relevance could be achieved through the identification of the information products retrieved and the filtering out of irrelevant items. Intermediaries are therefore in the position to select items of information that match the background and experience of the users, their previous knowledge and the problem(s) at hand. This will eventually translate into higher user satisfaction.

One of the most important attributes of information is its timeliness. Delays in processing may significantly reduce information usefulness to decision makers. Counselors therefore should be aware of the timeframe (deadlines and schedules) underlying the decision making process and make sure that the information received is not outdated.

The value of information to decision makers can be enhanced also by repackaging it into the form that is the most effective for the users. For example, information may take the form of quantitative data and be displayed by tables, graphs, charts, and so forth. Information may also be presented in qualitative form as in the use of categories and classifications. Also, the choice of the medium is important: computer print-

out, typeset sheets or microfiche. Information could be displayed on slides, screens, tapes, and disks. In many instances, the dissemination of bibliographies, or the full texts of documents are of little value because people do not have time to process this kind of product. The analysis and synthesis of several documents, the aggregation of data presented in tables found in different sources, might be more useful if the users' background, experience and current tasks are taken into consideration.

To some extent, the accuracy of information depends on the reliability of its original source or of its transmitter. Researchers and decision makers obtain data from both reliable and unreliable sources. Information counselors might be in the position to evaluate the reliability of an information source by examining its lineage and the medium transmitting it.

3.3 DECREASING COST OF INFORMATION PRODUCTS AND SERVICES TO USERS

Costs are associated with the acquisition and transmission of information. While the benefits of information are difficult to assess, cost estimates are measurable. Information counselors may not only enhance the value of information but they may also decrease its cost to the user.

As we have seen before, intermediaries can play a cost-reduction role in online searching. They may compare database royalties, maximum and minimum price schedules, online versus offline printing charges, or transmission costs.

3.4 SPECIFIC TASKS OF INFORMATION COUNSELING

It would be premature to speak of a job profile of the professional information counselor because only research and demonstration projects could lead us to the development and testing of job characteristics and desirable professional attributes. Eventually, recommendations for qualifications should be based on national and international discourse in professional associations and the educational committees of intergovernmental organizations.

However, expectations are already emerging based on the gatekeeper studies of earlier years and on projections of findings into current information environments. For example, it is quite clear that any individual in the role of the information counselor should have sufficient stature and influence in the organization to work in partnership with managers, scientists and engineers. Some professionals achieve this through subject specialization and work on research teams in a dual capacity, giving support to the team as information practitioners and taking part in the research activities as scientists. Others develop an unusual grasp of interdisciplinary understanding including economic, legal and policy relationships, and thus they play a boundary-spanning role for teams.

There are information counseling tasks that are of general character and, independently of the information environment and site, are essential to any user-oriented information service. Most tasks, however, are dependent on the characteristics of the sector and the communication modes of scientists, technologists, decision makers and public participants in that sector. For example, work in coastal zone management

produces data flows and information transactions that are different not only in content but also in form and channels from the data and information movements in population studies. The technological gatekeeper is known to be a node in and an influence upon a specialized communication pattern.

The general and specific tasks of intermediaries are interrelated. One of the most important capabilities of an information counselor is the skilled balancing and coordinating of all processes. If a counselor is working with a project, the strategies of the project will have to be scrutinized in the light of overall organizational goals.

Based on the experience and fragmentary understanding we have about gatekeepers and other intermediaries, the composite model of the information counselor may include the following tasks:

- Coordinating closely with the objectives of the organization and of the project; liaison with management, technical and research staff and external users; elaboration of the social and ethical responsibilities of counseling;

- Advocacating and spreading the idea that organizational productivity, innovation and social usefulness depend on strategies supported by information;

- Providing information in response to queries as well as in-depth technical assistance to users in solving specific problems or completing specific tasks; developing an understanding of people's thinking about problems or tasks and methodologies for assisting them;

- Analyzing continuously information needs and requirements on the basis of the background and current tasks of users; using information collected about each query and about user perceptions of each response, thereby "logging" and "monitoring" each information transaction;

- Involving users in sharing their experience and familiarity with the field; scanning the external environment for experience and expertise, human resources, social and economic trends, new telecommunication and computer products, and opportunities for joint ventures or collaborative research;

- Assisting management in the formulation of information policies within the organization by

researching areas of privacy protection, copyright, patents, transborder data flow standards and other current issues;

- Identifying pertinent information resources inside and outside of the organization including systems, data banks, libraries, and networks; use of communication skills to liaison with sources of expertise;

- Carrying out literature searches online or manually, in the mode most appropriate for the situation; evaluating, filtering, repackaging and disseminating results in summary technical reports and policy briefs; studying alternatives (newsletter, electronic bulletin board, public forums, etc.) to the current awareness service and making decisions jointly with users;

- Assisting user groups and management in reviewing and improving information systems, procedures and policies; identifying (a) new informal contacts and (b) informal scientific gatekeepers; making referrals in the context of

carefully considered policies that observe individual privacy, intellectual property, and use of proprietary information inside of the project and the organization.

4. INFORMATION POLICIES

Managers of all types of information facilities (libraries, archives, records centers, information centers, data centers, etc.) are in need of policy analysis skills. Decisions cannot be made in a societal vacuum. Rather, they must be based on an understanding of information policies in the organization, in the community, in the region, and at the national and international levels. Research in the disciplines of public administration and business management has demonstrated that the quality and effectiveness of decisions most often depend on the manager's grasp of the interrelationships among various policies.

One needs to distinguish between two related but distinct concepts: information for policy making (in relation to any sector such as government, health care, industry and business, environmental protection, social welfare, etc.), and information policies.

Policies may be embodied in formal instruments such as laws, rules, standards, treaties and codes of conduct, or they may be informal, expressed by norms, tradition, customs and beliefs. Whether policies are formulated by a government, a professional association, an institution or an individual, they may be of two kinds. Some policies are made in

response to a suddenly felt need or crisis, while others are the result of systematic long-range planning.

4.1 CONCEPTUAL BACKGROUND

A comprehensive information policy may be defined as a plan for the development of information resources and their optimal utilization. However, this definition can hardly ever be translated into reality. No country can point to a "comprehensive" national information policy, only to a set of fragmented policies, each dealing with a different aspect of information handling. Moreover, the merging of computer and telecommunication applications opened the way to an era where the growth of technologies is way ahead of our understanding of their social impact. But the utility of knowledge in support of national development has been recognized by governments. As a consequence, in many countries today efforts are underway to review, revise and coordinate a large number of separate policies relating to informatics and telematics (90).

Development is a culture-based process encompassing changes in the entire economic and social fabric of societies. Policy makers in developing countries are beginning to strengthen three essential elements: specialized human resources, research, and information dissemination to wide strata of the population. Information policies in developing countries have the potential to bring the best effects of new technologies to bear upon innovations and improvements in every sector of society.

4.2 EXAMPLES OF POLICY NEEDS IN DEVELOPING COUNTRIES

The managers of information, library and archival services in developing countries often voice the following needs:

- Assessing information needs and resources in various sectors of the economy,
- Developing an indigenous workforce for general information management and for specialization for the managerial responsibilities in libraries, documentation centers, archives and record centers,
- Strengthening indigenous research capabilities and closer interaction between research, practice and education,
- Disseminating information more effectively to enterprises and various population groups,
- Developing networks and specialized information clearinghouses in each region,
- Expanding the concept of scientific and technical information to cover the economic, social and legal aspects of scientific and technological development.

In order to coordinate resource allocations and programs in these various undertakings, managers most of all need to participate in the formulation of national policies which define information as a national resource and guide in the development of information infrastructures.

4.3 TRANSBORDER DATA FLOW (TDF)

The following section might be entitled international telecommunication services, telematics services, or transborder data services. These activities are closely interrelated and affect each other in numerous ways. In the last two decades, the transport of data

across borders by electronic or other means emerged as a target of intense debate in the wake of complex economic and social developments. The joint application of telecommunication, computers, and the paradigms of informatics to the entire range of human and social affairs has changed those nations and personal lifestyles which have been touched by it. Countries with less developed communication capabilities have also been drastically affected, but in these cases the impact has been tragically negative, because in today's international economic arena the interdependence of nations is an unquestionable reality. Thus, transborder data flow (TDF) in its multifarious and everchanging forms, has become a pressing global policy issue. Information counselors need a fundamental understanding of this issue in order to interact with their clients and to plan their services in a knowledgeable way.

Numerous definitions and descriptions of TDF are embedded in the international literature. The following representation merits particular attention because it distinguishes the transmittal of information items from the transmittal of mass communication messages: "Trade in data services - or transborder data flow (TDF - is defined as point-to-point movements of machine-readable data across national boundaries" (91). Mass communication messages, on the other hand, are broadcast from one point to multiple points.

The Organization for Economic Cooperation and Development (OECD) described TDF more broadly as "an entire process involving the collection, organization, and relocation of information resources to another country for processing, storage and use" (92). Mowlana asserted that "to

qualify as transborder data flow, the technical process must involve: 1) transmission; 2) storage; and 3) processing" (93). All three of the above interpretations focus on data.

Although the International Commission for the Study of Communication Problems (The Sean MacBride Commission), did not specifically define TDF, its inclusive characterization of "communication" as a human activity is relevant to this discussion. Communication, in its broadest sense, was described as "an individual and collective activity embracing all transmission and sharing of ideas, facts and data" (94). The main functions of communication in any social system were identified by the Commission as information, socialization, motivation, debate and discussion, education, cultural promotion, entertainment and integration (95). This extremely broad picture of communication activity at the international level allows for the conceptualization of information transmission not only in science, technology, trade and financial matters, but also in educational and cultural information exchanges.

International systems use so many kinds and levels of technology that selection has become a major problem for individuals, organizations and nations. Information products change far more rapidly than standards and evaluation methods. In countries with abundant technology, the customer has to consider and assess a variety of microimaging systems, workstations with software designed for specialized tasks, electronic bulletin boards, optical laser disks, online access to several thousands of bibliographic or numeric databases and many other products and

services. Important breakthroughs have also been made in integrated services digital networks (ISDN), based on digital transmission and switching (96).

However, computer equipment and software production, telecommunication facilities and data services are concentrated in a few areas of the world. In countries lacking a diversity of devices and the means to acquire them, governments, industry and research institutions struggle with the adverse effects of the flow of data from the country to be processed elsewhere, as well as with the acquisition of information from abroad. To face this problem, inventories of national data production and handling are needed, because "TDF should be dealt with by clearly analyzing what we could call 'Intraborder Data Flows' (IDF), since the phenomenon of the transfer of information between one country and another is closely linked to the internal phenomenon of the production and consumption of data within countries" (97). These issues are interwoven not only with trade interests but also with the striving for national cultural identity and independence.

Governments of different countries responded to the uneven trend of rapid technological change in different ways. In the 1970s, a series of national laws in industrialized countries, protecting the personal privacy of their citizens whose names and data appeared in data banks, provided that data processors must meet certain standards. Some of these laws and regulations mandated that data about their nationals must be processed within their boundaries. Such legislation was seen by international observers as nontariff barriers to information flows

serving both privacy protection and domestic industry protection. Several newly industrializing countries (NICs) turned to openly protectionist trade policies to build up self-sufficiency in telecommunication (98, 99, 100).

At the same time, low-income countries undertook to prepare for participation in international data and cultural communication at the political level. Throughout the 1970s, the international movement toward the elimination of inbalances in trade-related and cultural information exchanges centered around conferences, meetings and other fora provided by the United Nations, culminating in resolutions in favor of a New International Economic Order (101) and eventually in the demand for a New World Information and Communication Order (102). The latter movement, appearing under several alternative names, became an embittered international debate in which numerous positive recommendations of the International Commission for the Study of Communication Problems (development of national self-reliance, cultural identity, domestic publishing and rural press, research and development, professional cooperation, and so forth), were overshadowed by the militant political rhetoric of sharply opposing sides.

In recent years, through a reorientation from the political to the legal and economic framework of discussions, a potential rapprochement began to take shape (103). It should be emphasized that throughout the years of tension caused by the politicization of TDF, the international professional cooperation of scientists, scholars, educators and information professionals has helped to maintain continuity in contacts and information exchange.

4.4 ISSUES IN TRANSBORDER DATA FLOW

Several factors contributed to the current economic importance of data transfers and services including, among many others, the following international societal forces:

- Rapid expansion of world trade, communication networks and data services,

- International leadership of industrial and business organizations, especially the role of transnational corporations (104),

- The rise of informatics resulting from the effective management of information and communication hardware (machines), software (procedures and programs), and data handling (105),

- International cooperative efforts to share scientific, technological, socioeconomic and cultural information.

These and corollary trends, converging at the international level, created momentous policy issues which have not yet been resolved. As Granelli stated, ".... informatics development will very probably be one of the dominant factors in mankind's development and progress during the decades to come" (106). In the following section, we will review a few

examples of policy issues, because their impact on all types of information services places a grave responsibility on information professionals.

- The position of each country in international economic and trade relations determines that nation's access to markets and data and the development of its information laws and regulations. One of the main conflicts centers around the need of all countries to promote their domestic industries in hardware and software production, computer services bureaus, network services, and commercial information retrieval services.

- National security and sovereignty, two primary goals of development, are supported by TDF under favorable economic conditions and may be undermined by when a country lacks control over international communication. In the distributed networks of large industrial organizations, proprietary data are vulnerable to interceptions. Government agencies with proliferating data networks are exposed to similar possibilities (107). The cryptography policy of a government aims at providing computer security, safe intelligence functions by increased encryption capability, and the development of defense systems without system interruptions or failures. Remote sensing by satellites produces

data regularly used by industrial countries and aspired to by all nations of the globe.

- The complex issue of technology transfer embraces three levels: (a) machinery, (b) technological information necessary for domestic development, and (c) technical expertise. Technology transfer and TDF issues are inseparable: Data transport may promote the importation and adjustment of foreign technology or it can be the target of importation itself. In many countries domestic technological research, development and assessment systems remain weak because of the lack of scientific and economic data (108, 109, 110).

- One of the main benefits of TDF for an industrializing country is the strengthening of domestic research and development activities by data for the support of national human resources, education and training, and the dissemination of information needed by researchers (111). This issue has been an important dimension of national science policies for many years with emphasis on the use of research for social goals (112).

- A global concern that predates the emergence of TDF, the flow of scientific and technical information (STI), has been embodied in the efforts of intergovernmental and

nongovernmental organizations to develop international cooperative information systems (113). Under the influence of TDF, economists and national planners favor restrictions on STI while scientists usually oppose them. A study on international access to online databases made several recommendations on ways to strengthen the capability of developing countries to use databases (114).

- The protection of individual privacy represented the dominant issue in TDF in the early 1970s. "Privacy" has been defined as a sociocultural issue with legal implications (115). The two main aspects of privacy legislation include (a) the prevention of disclosure of personal data in a database to others than the subject of the data, and (b) the right of individuals to know about data collected about them and to correct errors and misrepresentations. Critics of these concepts include advocates of the free flow of information, owners of proprietary information, and legal experts concerned with the incompatibility of one country's law with personal rights in another country.

- In the North-South debate on the effects of TDF, cultural issues are the ones most exploited for political arguments. The reason might be the

extraordinarily broad range and ambiguous definition of "cultural issue." As countries rediscover the value of indigenous heritage, customs and languages, external influences on these genuine domestic resources are viewed with resentment. Cultural issues pertain to spillover from foreign broadcasting, imported radio and TV programs, films, journals, and other products of cultural industries. Remote sensing by satellites is also seen as a potential threat to developing countries because the data collected by satellite are disseminated by other governments without their consent.

- Arguments about mass communication as a divisive policy issue culminated in the report of the MacBride Commission and events directly related to it (116, 117). International news agencies use satellite and other communication networks to transmit news reports and to provide their subscribers with information. The MacBride report represented the view of most developing nations that the flow of news was unbalanced because of the sensationalist treatment of news about Third World countries by a handful of major international news agencies. Moreover, the report stated that the same few agencies disseminated filtered news about Western countries. The response of Western countries was a rejection of any interference with the press. Unfortunately, the polit-

ical debate drew attention away from research on this policy conflict and on other vital aspects of mass communication (118).

- The prevailing international policy for allocating use of the electromagnetic spectrum and of the geostationary orbit has been challenged by representatives of developing countries. Both are resources of mankind but are used predominantly by countries with superior technological capabilities. The United Nations' International Telecommunication Union (ITU) maintains treaties with various countries for radio frequency allocations that can be renegotiated every twenty years. At the last World Administrative Radio Conference (WARC) in 1979, developing countries sought allocations of the spectrum, upon which radio, television, and computer messaging by satellites depend, on a systematic rather than on a first-come-first-served basis. The current use of the geostationary orbit by communication satellites (e.g. Direct Broadcast Satellites) was challenged by a similar argument at "Space WARC" meetings. Two policy issues represented the core of the debate: a new mode to allocate the geostationary orbit by the ITU, and the concern about the content of the DBS messages beamed into countries which have no control over them (119).

4.5 TDF POLICY INSTRUMENTS

Policy instruments are formal measures and informal social norms and values that compel and/or motivate people to conduct their pursuits and the affairs of their society in a certain mode. At the domestic level, formal policy instruments encompass national laws, regulations, rules, declarations, edicts, orders, judicial decisions, governmental standards, and so forth. International treaties are formal agreements between two or more countries, usually supported by corresponding domestic laws in the signatory countries. Informal policy-guidance is embedded in the norms and customs of nongovernmental corporate groups including private organizations, professional associations, religious groups, and others. Such informal policy instruments normally evolve from the shared values and cultural traditions of the group. In information transfer, two semiformal instruments have been playing a key role: standards (agreements reached and formalized by individuals and organizations to follow certain processes and/or to maintain certain levels of performance or product quality) and protocols (a set of rules for interaction by electronic means).

The limitations of this paper allow only for a few examples of international efforts to formulate TDF policy. Over the years, the objective of numerous conferences and negotiations has been to develop guidelines that could be used as a basis of a comprehensive international agreement on TDF. Such an agreement, "enabling a fair and correct control of transborder data flow, and taking into account all the needs, could become a factor of utmost importance in relations between countries

and could considerably contribute to detente, to stability, and to world peace" (120). Although such agreement on TDF policies has not been reached, some progress may be observed (121).

Selected examples of intergovernmental organizations and their efforts toward coordination of TDF policy discussions include the following:

COUNCIL OF EUROPE

Convention for the Protection of Personal Data 1981

EUROPEAN ECONOMIC COMMUNITY

Directorate General for ST Data Management (DGXIII)

INTERGOVERNMENTAL BUREAU OF INFORMATICS (IBI)

International Consultative Commission for TDF Development

First World Conference on Transborder Data Flow Policies 1983

Second World Conference on Transborder Data Flow Policies 1984

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)

Information, Computers, and Communication Policy Committee (ICCP)

"Guidelines Governing the Protection of Privacy and Transborder Data Flows of Personal Data" 1980

"Declaration on TDFs" 1985

UNITED NATIONS CENTRE FOR TRANSNATIONAL CORPORATIONS (UNCTC)

National Case Studies on TDF

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD)

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO)

UNITED NATIONS GENERAL AGREEMENT ON TARIFFS AND TRADE (GATT)

UNITED NATIONS INTERNATIONAL TELECOMMUNICATION UNION (ITU)

International Telegraph and Telephone Consultative Committee (CCITT)

First World Conference for the Development of Telecommunications 1985

World Administrative Radio Conference (WARC) 1979

World Administrative Telephone and Telegraph Conference (WATT) 1988

4.6 POLICIES AND INFORMATION COUNSELING

Developments in TDF and other international and domestic information policies signal a new set of responsibilities for information counselors which has not yet been sufficiently explored. As online searching of databases is increasingly performed by end users, information counselors in each country may shift their emphasis to advising users about complex infrastructures and resources, cooperative relationships in information

and data exchange, and the implications of policies for each nation and for each particular information seeking situation.

Information counselors need to keep up-to-date with new developments in many areas of policy action and research. TDF policies draw on the expertise of many different disciplines and professions, for example economics, law, science, technological innovation management, development science, public administration, and so on (122, 123, 124). Although an information counselor cannot become a specialist in all these interacting areas of knowledge, the ability to identify linkages among different fields and to locate information resources by and for different experts is indispensable.

With the changing direction and tone of policy negotiations and studies from emotional politics to cooperation between the public and private sectors in developing sound economic conditions in each country, information counseling has to pay particular attention to the following trends: (a) the progress in many developing countries toward privatization and South-South cooperation among private enterprises (125, 126), and (b) the growing interest in indigenous creativity and management skills in developing countries demonstrated by some multinational corporations with headquarters in the United States or other industrial countries. As Bartlett and Ghoshal of Harvard University observed about multinational industrial organizations:

> ... vital strategic information now exists in many different locations worldwide... Furthermore, the growing dispersion of assets and delegation of responsibilities to foreign operations have resulted in the development of local knowledge and expertise that has implications for the broader organization (127).

These are trends which augur a strengthening of mutual support among developing countries in information policy matters as well as the possibility of improved relations between the private sectors of industrial and developing countries.

Advances in new technologies, such as the applications of laser optical disks (CD-ROM and WORM systems) to the information needs in developing countries, will have to be brought to the attention of policy makers and managers. Constant alertness to the availability, costs and potentials of such new applications cannot be expected from high-level information users. Rather, it has to become an important part of the information counselor's range of capabilities.

5. IMPLICATIONS FOR EDUCATION AND TRAINING

We have to nurture and strengthen a new professional role that was not created overnight but has evolved from several antecedents and non-formal, noninstitutionalized activities, and we have to learn from it by observing, describing and testing its behavior before recommendations for a job profile and qualifications can be suggested. Formalized job descriptions can be created by workplace requirements, professional standards agreed upon by consensus among groups, employment policies, or the analysis of job content. None of these conditions have been fulfilled in the case of information counseling. We believe that, for the time being, information counseling will remain an important "role" rather than a "job." But it is hoped that as a role, it will be acknowledged and supported by governmental and professional policies, that it will be studied and continuously enhanced.

This section will focus on (1) reflections on professional educational and training, (2) areas of particular strength of the model, and (3) suggestions for capabilities which could further enhance these strengths.

Although we do not envision the immediate creation of an "information counselor position," it seems essential that counseling and gatekeeping be carried out by an information professional with full qualifications gained through postgraduate (Master's level) study in addition to subject specialization. Professional education normally includes (a) the sharpening and focusing of cognitive abilities, (b) fostering of professional thinking, attitudes, and client-practitioner relationships, and (c) development of pertinent skills. These areas are complemented by three approaches: (a) theoretical education laying the foundation of the conceptual parameters of the profession or of a role therein, (b) elements of professional conduct, and (c) training in techniques and methodologies. This background will be necessary for building special areas of knowledge and competence.

It is important to distinguish information science, a research discipline, from information counseling, management, and other forms of professional practice. Information science forms the theoretical foundation of information practice in any form, be it the management of information resources, librarianship, or the management of archives and daily records. Information science encompasses the propositions for and concepts of the phenomena and behavior of information produced by research. Vickery and Vickery defined information science as "the study

of the communication of information in society" and added that "this meaning is only beginning to emerge from its practical background, the social activity of facilitating information transfer" (128).

We can also distinguish between science and the professions by their historical roles. Traditionally, science has been described as having a universal and unifying character and pursuing long-term goals, while the professions are said to be guided by social demands, public policy, priorities and client expectations. Today, science is affected more and more by immediate national goals, and the service professions, drawing on the resources of an impressive array of technologies, are attempting to shape public policy and client needs rather than being guided by them.

As the economic implications of information transfer as a national resource are globally recognized and the development of the information workforce is becoming a national policy issue in most countries, there is a critical need for closer cooperation among the various information professions and information scientists. UNESCO's General Information Programme (PGI) has been promoting cooperation in what has been termed "the harmonization" of education and training programs. Emphasis is placed on teaching management, the application of technology, and user studies (129, 130).

There are further steps needed in innovation. Crossnational cooperation is especially important in (1) organizing seminars on the relationship that links information, technology, and national development strategies, (2) identifying research areas for comparative investigation,

(3) promoting educational exchange programs, and (4) gaining more understanding of the process of formulating national and international information policies.

Cooperation can be carried out through national, regional and international professional associations. Of the three types, regional professional associations are the most effective. In the context of economic and social development, the regional professional association representing information professionals has the potential to take on the responsibility for the initiation and coordination of education, training, and professional development projects. Of similar importance is the task to explore and encourage workshops on the diffusion of research findings to practitioners and decision makers, and on marketing by information services.

There are many current efforts worldwide to revise and redesign curricula in view of national policies and development trends (131, 132). Some of these trends are technology-driven and lack emphasis on the human aspects of information transfer. Other changes in the information science curriculum introduced courses which were directly pertinent to the needs of the information counselor. New research on decision making and problem solving can always provide roadsigns for new forms of information support for these activities (133). The following areas in information education and training enhance not only the process of information counseling, but also the activities which, in the past, belonged to the realm of informal gatekeeping.

5.1 Analytical Capabilities:

Systems planning and design; methodologies for need assessment and evaluation research; data-, word-, and information-processing; benefit-cost analysis; budgeting; analysis of organizational hierarchies and processes; technology assessment; information analysis; search strategies; and basics of information market analysis.

5.2 Policy-related Capabilities:

Identifying relationships between the components of national information and communication infrastructures; review of policy instruments; recognizing national and international policies that affect local information processing; development, review and adaptation of information policies within the organization; decision-making skills; use and dissemination of policy research.

5.3 Technological Capabilities:

Knowledge of information and telecommunication technologies and applications; rapid orientation to emerging technologies; use of micro-computers for innovation; word and information processing; fundamentals of data base management; networking; cooperating with other units in the organization in technology applications.

5.4 Communication Capabilities:

Interpersonal communication; group techniques; planning meetings and conferences; leadership skills; supervision of staff; interdisciplinary work; application of communication skills to information marketing and

dissemination; oral and written presentations; demonstration using audiovisual techniques; user training; repackaging information for purposes of the end user.

Many other skills and competencies were identified by a survey aimed at ultimately strengthening the dissemination of information is support of development (134)

6. RECOMMENDATIONS

6.1 In order to identify and test the potential contributions of the information counseling model to the quality and economy of information transfer and use, it is suggested that pilot research and demonstration projects be carried out. Settings where the model could be best tested include research institutions, government agencies, the research and development divisions of industrial organizations, and academic departments. It is recommended that national and international governments and nongovernmental organizations collaboratively support such projects and that results be widely disseminated.

6.2 As part of the pilot projects, there will be a need for inventorying user demands, for gathering data on query answering and for collecting qualitative information about user perceptions of information counseling as well as of networking and other information communication. The results of research should be published and disseminated.

6.3 A meeting of experts should consider a job profile and its attributes, based on user demand inventories. The proposed job description should be transmitted to professional associations in various countries for discussion and comment. The model should be adaptable and flexible, in order to be adjusted to the professional environments of different countries.

6.4 The expert meeting's report and recommended policy should be followed by demonstration projects of information counseling in locations different from the sites of the pilot research projects.

6.5 Guidelines for information counseling activities and for the formalization of gatekeeping functions will be necessary for the review and consideration of professional associations.

6.6 Education and training requirements should be discussed and seminars by academic information science programs considered.

6.7 It is further recommended, that the final report on the results of research and demonstration projects be disseminated.

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